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COINs2010: Collaborative Innovation Networks Conference

COINs for Government: Collaborative Innovation Networks used in nascent US Government initiatives.

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Abstract

With the growing success of internet based collaborative for profit ventures, including Innocentive, VenCorps, Threadless and many others, governments have begun to take notice. Recent public sector initiatives, including Open.gov, Peer 2 Patent, innovation.ED.gov amongst others, have begun to leverage collaborative internet media through similar means as their for profit cousins. On the basis of the Collective Intelligence Genome framework. which was developed to describe private sector ventures, this study reviewed the recent public sector initiatives launched by the American federal government. Our goal was to examine if, and how, the Genome construct would apply to not for profit ventures intimated by the U.S. federal government. Our findings show that while the model fits generally, some extension was required. Our findings make the case for an expanded genome framework with four new genes to describe public sector ventures. Our study concludes that with the use of these new genes it is possible to apply the Collective Intelligence Genome framework to all existing public sector ventures.

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Keywords: Open Government ; COINs; COINs for Government; Collective Intelligence Framework

1. Introduction

Internet technology has moved into the foreground over the past decade. Private sector firms have begun to heavily leverage their online presence to source innovation and reinvent their businesses. The best example may be Proctor & Gamble's shift from command and control to collaborate and connect (Strategic Direction, 2005; Hagel III, Brown, & Jelinek, 2010). The rapid growth of Facebook, from 100 million active users in 2008 to 400 million active users in early 2010 (Facebook, 2010), has been paralleled by the rapid adoption of web media in pubic ventures. Moreover, web media have even taken a central role in the US Government's Open Government Directive with nearly all initiatives having an online presence (Ding et al., 2010). This manifestation can be seen as an extension of the Open Innovation (Chesbrough, 2003)/ Crowdsourcing (Howe, 2008)/ Wisdom of Crowds (Surowiecki J., 2004)/ Wikinomics (Tapscott & Williams, 2006) paradigm in which online media are leveraged to perform a more central role in society.

With the growth of decentralized organizational structures in private firms during the 90's and popularity of virtual teams (geographically dispersed teams interacting through virtual means), academic interest in the realm of decentralized innovation models have grown rapidly and have spawned an array of rationalizations (Andrews, 2010; Gassmann, 2006; Jarvenpaa & Leidner, 1999). The aforementioned models of Crowdsourcing, Wisdom of Crowds and Wikinomics all served to explain the emerging phenomenon of decentralized innovation pipelines occurring in some of the world's leading organizations and not-for-profit organizations with a profound impact on society. The popularity of these models has further spawned a wealth of management research attempting to rationalize these

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models and develop actionable frameworks to explain them. In an MIT Sloane Working Paper, Thomas Malone, Robert Laubacher, and Chrysanthos Dellarocas (2010) from the MIT Center for Collective Intelligence propose a Genome framework to explain and classify the subtleties of these emerging frameworks. The genome framework which describes a firm's collective intelligence framework can be classified by answering four design questions (as illustrated in Figure 1.)

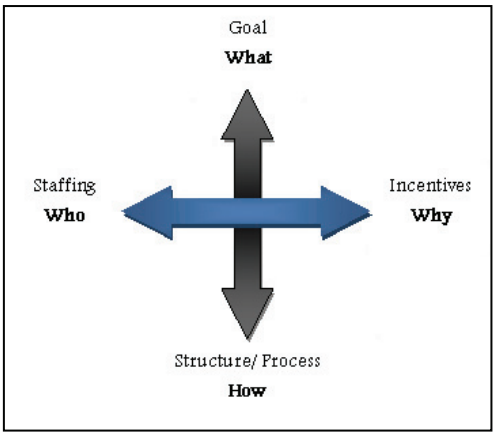

Figure 1. Decision Questions for Genome Framework
Adapted from: Malone, Laubacher, & Dellarocas (2010)

This paper aims to apply the Collective Intelligence Genome, developed to explain manifestations from the private sector, to the nascent initiatives being implemented in the public sector by the Obama administration. In doing so, this paper will attempt to explain the degree to which this genome applies to public sector initiatives and propose any new genomes which may fit into the models. Malone et al. call for further investigation into the application of these genomes and an expansion of the genome framework to include emerging organizations. This paper aims to answer that call.

Investigating the Collective Intelligence genomes, as proposed by Malone et al. (2010), pursuant to nascent government initiatives, the research questions addressed in this paper are twofold:

> **HP1:** Can the Collective Intelligence Genome introduced by Malone et al. (the "Malone Model") act as a framework to describe public sector ventures as well as private sector ones?
> **HP2.** What, if any, new Collective Intelligence genes need to be added to extend the Malone Model to specifically describe public ventures, especially those reflecting the new open government initiatives?

This paper will aim to address these two hypotheses and develop the literature on Collective Intelligence genomes within the public sector. However, this paper will begin by reviewing the underpinnings of Collective Intelligence and the taxonomies of such from relative current literature.

2. Collective Intelligence: A literature review

The discussion of Collective Intelligence both encompasses and surpasses many of other existing conceptualizations which have emerged to date (Open Innovation, Crowdsourcing, Wisdom of Crowds, and Wikinomics). Before the literature is examined, one must first have a common taxonomy. Unfortunately, due to the rapid expansion of the field both in academia and popular media, no such widely agreed upon taxonomy exists. Instead, many authors have created redundant or conflicting definitions for key terms. The following section addressing current taxonomies elaborates on the distinction between these concepts.

Taxonomies within Collective Intelligence

The terms Open Innovation, Crowdsourcing, Wisdom of Crowds, Peer-production and Wikinomics all fall within the scope of Collective Intelligence. Crowdsourcing and Wisdom of Crowds have similar meanings albeit different origins. *Crowdsourcing* was introduced by Howe (2008), in his book by the same name, who argued that crowds, informally linked groups of people external to the firm, have the potential to transform traditional firm processes. Finance journalist James Surowiecki introduced the notion of the *Wisdom of Crowds* in 2004. He argues that crowds provide better insights into business processes than do experts within the firms themselves. While these concepts are offered by a number of authors, fundamentally Howe and Surowiecki both assert that firms can improve the performance of their business processes by leveraging the Collective Intelligence of 'crowds' external to the firm. Similarly, Peer Production argues that decentralized information gathering and collaboration can improve the effectiveness of processes through the aggregate inputs of a large group of people (Benkler, 2002; Benkler, 2006). This was built upon by the concept of *Wikinomics*, put forth by Tapscott and Williams (2006), which is built around the tenets of Openness, Peering, Sharing and Acting Globally. These tenets define firm processes which reflect the Wikinomics paradigm whereby the inputs of the crowd are taken as inputs to firm processes. Conversely, Open Innovation was introduced by Chesbrough (2003) who suggested that organizational processes can be more effective when they traverse (often several times) the traditional boundaries of the firm. While Wisdom of Crowds and Crowdsourcing purport similar things, in practice Open Innovation represents a strategic direction which firms can undertake. As such, Open Innovation has its roots in academia whereas Wiknomics, Crowdsourcing and The Wisdom of Crowds have their origins in the titles of popular mass media books.

We believe that the public and academic discourse lack an authoritative and widely accepted taxonomy for such. To support the adoption of a conventionally understood definition of this phenomenon, we adopt the following from Malone, Laubacher, & Dellarocas (2010): Collective Intelligence, defined as "groups of individuals doing things collectively that seem intelligent", both encompasses and expands on the aforementioned concepts which assert that groups of people outperform individual experts by leveraging their Collective Intelligence (Howe, 2008). This assertion was proven by Wise, Valliere & Miric (2010) who showed that groups leveraging Collective Intelligence can outperform individual experts in a controlled set as is suggested by all of the aforementioned concepts. Collective Intelligence, as defined by Malone et al. is inclusive of all the other concepts which have emerged in modern management literature.

The growth of the internet and its effect on Collective Intelligence. A review

Malone et al. (2010) purport that the widespread adoption of the internet, which has spawned all of these crowd harnessing mechanisms, has effectively changed the way intelligence is collectively developed (Malone, Laubacher, & Dellarocas, 2010). These web mechanisms have largely come from the private sector (including not-for-profit organizations) and have to date been led by firms such as Google and organizations such as Wikipedia which have thrust the use Collective Intelligence mechanisms into our daily lives. These widely cited cases are described below.

Google web search "understands exactly what you mean and gives you back exactly what you want," according to co-founder Larry Page (Google, 2010), by leveraging the Collective Intelligence of the internet. The algorithm Google uses ranks the importance of respective web pages on the basis of the collective actions of others on the internet and manages to present accurate search results as a result of their Collective Intelligence.

Wikipedia presents articles and information created by the users without any central coordinating mechanism guiding them. Thousands of individual contributors collectively building and moderating the Wikipedia archive have created the world's largest encyclopaedia without any extrinsic reward to themselves. Rather these individuals have collectively created the largest single repository of explicit knowledge simply for its intrinsic rewards.

The two aforementioned examples represent Crowdsourcing and Collective Intelligence in their truest forms. While these cases have fundamentally changed the nature of their respective industries (or markets) they do leverage

Collective Intelligence as in the development of their future projects. This can be seen as creative destruction in the Schumpeterian Form (Schumpeter, 1934) whereby the novel use of Collective Intelligence has utterly changed the competitive landscape.

3. Collective Intelligence in Public Service: A revolution.

Longstanding literature from Mintzberg (1980) has argued that organisational structures conducive to collaboration operate as an "adhocracy" whereby individuals are highly specialized and engage in collaboration as a result of their intrinsic motivation to do so. In such a configuration, individuals are free to coordinate amongst themselves and engage in collaboration on their own terms (Mintzberg & Mchugh, 1985). There exists no strict formalization obligating individuals to engage in any given collaboration. While the intention behind Mintzberg's work was to describe the internal structures of organizations themselves, the notion of an 'adhocracy' foreshadows the decentralization and adoption of internet medium which companies have begun to leverage in harnessing collective intelligence.

The term *Cyberocracy* popularized by Ronfeldt (1992) alludes to a future where information technology would facilitate government and a cybercratic nexus-state would replace the longstanding nation state. This theory's optimistic forecast and gloomy warnings are more a treatise on political organization than a framework for collective intelligence and it has recently been revisited by the original author who argues that networked governments are emerging and that the tentacles of government are being brought together by networks (Ronfeldt & Varda, 2009). Ronfeldt's assertions are beyond the scope of this paper; however, the role of networks in government practice has burgeoned over the past decade with information technology being strongly linked to government reform (Martin & Gregor, 2005). Small scale studies have found that this growth of internet technology has shaped and altered government practice, especially when leveraging Collective Intelligence through internet media (Griffiths, 2007). Even though the use of internet technology in government has gained momentum of late, it presents a dichotomy as government actively mitigate access to their internal information (Mergel, Schweik, & Fountain, 2009). Regardless, there has been considerable momentum with regards to popular issues such as climate change and the role that Collective Intelligence can play in battling climate change (Malone & Klein, 2007). The growth of such a phenomenon does mirror the private sector developments in harnessing Collective Intelligence but it also suggests that genomes can be used to describe private sector initiatives as well. The idea of a Collective Intelligence Genome, put forth by (Malone, Laubacher, & Dellarocas, 2010), encompasses all of these subtle differences and suggests that there are simply different genomes of Collective Intelligence which serve to classify the differences occurring in mechanisms designed to harness Collective Intelligence. This genome is described in the following section.

The Collective Intelligence Genome: A review of the model put forth by Malone et al. 2009

The Collective Intelligence Genome offered by Malone et al. in 2010 aims to explain the different mechanism for coordinating Collective Intelligence in existence along lines of queries: Who, Why, What, or How with respect to a single task in the entire system. Individual "genes" answer differently to each of these questions. When looking at the questions of *Who contributes and undertakes the activity?*, Malone et al. (2010) propose two very commonly occurring genes: *crowds* and *hierarchies*. The distinction between the two is that an individual in a *crowd* can choose to do something if they are so compelled, whereas an individual in a hierarchy is delegated work from above which he/she is required to do. This idea is complemented by the Why gene which asks, What motivates people to take part? and, Why do they perform a specific task? Malone et al. (2010) propose the existence of three motivators or genes which serve to explain the reason why individuals contribute to Collective Intelligence systems. The motivators are Money, Love or Glory. Where money is a traditional extrinsic motivator and the most commonly occurring one in a hierarchical gene, Love and Glory represent more intrinsic motivators which reflect an individual's enjoyment of doing an activity or their desire to boast about their achievements. However, it is important to underline that the genes of Why and How simply reflect the mechanisms by which Collective

Intelligence is coordinated. Just as important is to understand the factors which influence industrious ends to which that Collective Intelligence is applied.

Interestingly, what is common in both hierarchies and crowds is that certain individuals have a capacity to create while others have a role in making decisions. That is not to say that those who create cannot have a role in deciding, but rather that the What question can be reduced to two simple genes: to create and to decide. However, to fully understand the What question it is important to first explain the How genes. The How genes classify Collective Intelligence systems along two lines: Collection and Collaboration. Collection represents a mechanism where individuals create independently of each other (e.g. Goldcorp). *Collaboration* represents a mechanism where the individuals independently contribute and create to produce a collective output (e.g. Wikipedia). However, when it comes to decisions under a collaborative gene, there are further subtleties with respect to whether the collaboration comes as a result of group decisions (vote/election) or as a result of individual decisions (market). Collectively, a specific set of genes can be used to create a genome which reflects the basic anatomy of a specific organization. The Collective Intelligence Genomes of Wikipedia and Innocentive as proposed by Malone et al. (2010) are shown below.

Table 1. Collective Intelligence Genomes of Wikipedia and Innocentive.

Example	What		Who	Why	How
Edit Wikipedia Articles	Create	New Version of Article	Crowd	Love, Glory	Collaboration
	Decide	Whether to keep current version	Crowd	Love, Glory	Consensus (Collective)
InnoCentive	Create	Scientific Solutions	Crowd	Money	Contest
	Decide	Who gets reward	Management	Money	Hierarchy (Individual)

While these genomes of Collective Intelligence are certainly the most heavily touted models of Crowdsourcing (open innovation, Wikinomics, etc.), they do not illustrate a crowd based creation and decision gene but one that operates on the basis of individual decisions. In contrast to Wikipedia, this means that even though individuals can create and decide on the articles in Wikipedia it is assumed that the final version of the articles is a consensus of everybody's decisions however, theoretically the mechanism allows for somebody who does not represent the majority perspective to edit it. Other firms have sought to overcome this dynamism and have the capacity arrive at fixed outcomes which cannot be changed later. The following example embodies this genome. VenCorps, an industry changing venture capital fund, allows entrepreneurs (any entrepreneur) to post their nascent ventures on the platform and allows the community at large to analyze, value and decide on which ventures deserve to be funded. The genome of VenCorps is shown in Table 2.

Table 2. The VenCorps.com Collective Intelligence Genome.

Example	What		Who	Why	How
VenCorps	Create	Start-up Business	Crowd	Money, Love, Glory	Collection
	Decide	Which business to fund	Crowd	Money, Love, Glory	Averaging (weighted)

This VenCorps genome is slightly differentiated from its aforementioned counterparts. This model acts as a decision/ idea management tool which warranting its own genome. The VenCorps genome represents a system where the crowd evaluates individual ventures on the basis of preset metrics and then votes to for which business should be funded and are then aggregated through weighted average mechanisms to determine which business to fund. While this context is limited to venture finance, the broader implications of this genome are its decision mechanism which utilizes the crowd to evaluate and decide on ventures. This model has recently been adopted by the US government to harness Collective Intelligence through the web.

4. US government on the web: A revolution in Harnessing Collective Intelligence

The 2008 Obama election campaign is famed for using innovative web technologies to leverage the financial and opinion powers of its constituent base (Vargas, 2008).Within the Obama administration's list of "Open government innovations" in its Innovation gallery, there are a few cases in particular which exemplify the use of Open Innovation in harnessing Collective Intelligence. Several of these examples are discussed below.

Veterans Benefits Administration Innovation Initiative was launched by the United States Department for Veterans Affairs to leverage the ideas and intuition of those individuals working within Veterans Affairs in helping to develop more innovative solutions to help veterans. The ideas developed by the individuals working within veteran affairs are going to be submitted though a web based platform to an Idea management tool based on the VenCorps platform.

Innovation.ed.gov was launched by the US government as Open Innovation Web Portal open to source innovations to improve the standard (on average) and quantity of students which come out of the US education system. This Built on the VenCorps Platform, the innovation.ed.gov platform allows all relevant stakeholders to contribute, either as creators of ideas or as independent stakeholders to express their own opinions, and in doing so shape the very nature of future education initiatives in the US.

These two cases provide an interesting example of how Collective Intelligence is harvested in a public setting. While these initiatives do serve a different and arguably higher purpose than those in the private sector, they do have very obvious similarities. Conversely, there are some profound differences which should be discussed when applying the genome framework to that of public institutions.

5. Findings

There are currently one-hundred-and-three US federal government initiatives listed on www.WhiteHouse.org/open which have been reviewed in this study. Of the one-hundred-and-three initiatives investigated, only 2.91 % of those initiatives could be described fully by using only the existing genome framework developed by Malone et al. (to describe private sector ventures). As a result, the authors propose the introduction of new genes specific to public sector ventures. When these genes are added, the existing genome framework developed by Malone et al. can be extended to encompass public sector ventures. These new genes are listed in the following table.

Table 3. Proposed New Genes for Genome Framework.

GENE	DEFINITION	EXAMPLE

Interest (WHY)	Individuals with a vested interest in a government initiative can be seen as stakeholders ("Stakeholders are those social actors having a stake (or interest) in the focal firms actions, because they are affected (benefited or harmed) by the firm´s behaviour." (Rowley & Moldoveanu, 2003)) For the purpose of this paper it is necessary to replace the term Stakeholders (individuals with a vested interest) with users. The definition extends to individuals who act as a result of Self-interest, Power and Professionalism. This represents the motivator for the hereby introduced "Interest" gene.	Soldiers participate in the Wikifield Army Guide not only because of Love and Glory. They have the self-interest to participate in this project, because it increases their chances of survival in the field. They are affected personally by changes in the Wikifield guide.
Civic Duty (WHY)	Civic duty can be seen as the obligation of the individual to act to the betterment of their society. Civic Duty represents the impetus for an individual to contribute to the decisions made by their government. This gene is specific to public sector ventures, however it can be seen as public sector likeness of the 'love' gene from the private sector, where people contribute to a cause they perceive to be larger than themselves.	Management (executive branch of government) decide which suggestions should be implemented from the crowd into government policies. Some might have to interest or desire to improve the government, some might simply do it because it is part of their professional requirements.
Evaluate (WHAT)	The Decide gene introduced by Malone et al. is defined as a system where users "evaluate and decide". However, there have emerged several open government initiatives which allow individuals to evaluate however, the management (hierarchy) decides. This is defined as the Evaluate gene.	OpenEducation.IdeaScale.com allows individuals to evaluate and comment on the plan. However, the users are not allowed to decide nor are their opinions aggregated but rather they are simply allowed to evaluate.
Feedback- Public (How – Create)	Similar to the "collection" gene, the feedback-public gene occurs when individual inputs are collected however, the inputs considered in this case is feedback (actionable opinions and review) where the feedback of individuals is visible to the broader community.	The Listening and Learning Tour by Secretary of Education Arne Duncan includes a blog which allows stakeholders to publish publically visible feedback on issues relevant to education.
Feedback-Not Public (How – Create)	The "feedback-not public" gene is nearly the same as the "feedback-public" gene, however, the feedback of individuals is not publically displayed.	The IT Dashboard provides a transparent overview of over 7,000 Federal Information Technologies Investments. Citizens can give the CIO´s of the departments Feedback via a form which is not visible to others.

Collective Public Intelligence: A new genome Or just New Genes?

While the US government innovation initiatives mentioned in previous sections have obvious similarities with the VenCorps business model (especially given that they are built on the VenCorps Platform) there are some genuine differences which must be brought to light. While the model is consistent between public and private sectors with respect to the *What* and the *Who* genes, there is some discontinuity with respect to the Why and How genes. In order for the model to be fully realized, one needs to add new genes. This was foreseen by Malone et al. who conclude their seminal work with a call for new genes to reflect the organizational models which emerge over time.

Why contribute? The motivator's commonplace in the private sector (money, love, glory) may fall short when applied to the public sector. Since it is existing employees who are simply creating ideas to improve the way in which their work functions money is not a chief concern in most cases. The only exception is in the case of entrepreneurs who are attempting to develop a commercial venture to improve education (through *innovation.edu.gov*). Conversely, when it comes to the decision mechanism the motivators are certainly not monetary as the individuals receive no monetary benefit from their contributions. The rewards may be intrinsic (desire to improve the government, sense of civic duty) but these motivators cannot be described as love or glory in that it is not an individual's love of developing new approaches to handle veterans affairs or education, but rather their willingness to see the system change for the better and being compelled to act on that. Thus, we will loosely define this as a sense of civic duty and acting in one's own interest.

What is contributed? When individuals are asked to "Evaluate" a given alternative, their opinion, insights and knowledge are leveraged in assessing alternatives along preset metrics. Evaluate has an important distinction from "Evaluate and Decide" in that individuals evaluate a given alternative with respect to the given metrics and independent of other alternatives. The evaluate gene purposely avoids asking individuals to select the alternative which they perceive to be best.

How does one contribute? The question of how an individual contributes is largely shaped by the context and nature of a public program. If the *innovation.edu.gov* model is considered, the portal is open to anyone that wants to contribute and innovation can be sourced from anywhere. Conversely, the portal provides government support for the innovations deemed most important (where in a traditional model the government deems what is most important based on what is in the best interest of the people) so that they can be realized.

As the aforementioned genes have not been addressed in the initial model developed by Malone et al. (2009), the current authors propose them as an extension to the Malone Model aimed at the public sector. To illustrate this, the Collective Intelligence genome for both VBA innovation initiative and innovation.edu.gov are shown below.

Table 4. VBA Innovation Initiative and Innovation.edu.gov genomes

Example	What		Who	Why	How
VBA Innovation Initiative	Create	Ideas to improve Veterans Affairs Operations	Crowd	Civic Duty	Collection
	Decide	Which ideas to implement	Management (Gov`t)	Money, Civic Duty	Hierarchy
Innovation.edu.gov	Create	Ideas & ventures to improve education	Crowd	Civic Duty	Collaboration
	Decide	Which Ideas to fund and	Crowd	Civic Duty	Individual Decisions

implement

While these genomes are representative of two case studies, similar genomes describe the vast majority of initiatives listed under the open government directive. As previously mentioned, the existing genome framework developed by Malone et al., which did not include the genes proposed by this study, was not sufficient to describe the genomes for public sector initiatives. This study has shown that the Genome framework developed by Malone et al. is relevant but as was foreshadowed by Malone et al. it has been necessary to classify new genes to describe the public sector ventures which have emerged. That said, there are genes specific to each of these groups and the discovery of those genes and the extension of the genome framework has been the contribution of this paper.

While these genomes are simply a rationalization of an existent phenomenon, the authors believe that there is real value in developing such generalized frameworks and expanding them to encompass the full realm of Collective Intelligence initiatives which emerge.

6. Conclusion, Contribution and Future Work

As mentioned in the closing remarks of Malone et al.'s (2009) paper, there are more emerging businesses and organizations which link individuals and develop new ways of harnessing Collective Intelligence through the internet. While there will be new and innovative venture within the private sector, the coming together of public and private ventures to improve the level of public service is certainly of note and deserves to be investigated. While there are certainly differences between the public and private sector, the application of the genome framework of Collective Intelligence allows us to easily and accurately understand how the individual models differ from each other, and how well they satisfy their various constraints and requirements. One of our contributions is to answer Malone et al.'s call for the discovery of new genes and we propose several new genes specific to public initiatives. This study has introduced five new genes which are necessary to describe the genome which are specific to government operations. In addition, as this article has shown through the genome of Collective Intelligence framework, the Innovation.edu.gov platform is a good marriage of both individual initiative and government intervention and there is no telling how much further this framework can be extended.

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